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Relevance scale

81 Evolutionary hardware: Evolutionary computation applied to the tuning of MEMS gyroscopes

Didier Keymeulen, Wolfgang Fink, Michael I. Ferguson, Chris Peay, Boris Oks, Richard Terrile, Karl Yee

June 2005 **Proceedings of the 2005 conference on Genetic and evolutionary computation GECCO '05**

Full text available: pdf(1.23 MB) Additional Information: full citation, abstract, references, index terms

We propose a tuning method for MEMS gyroscopes based on evolutionary computation to efficiently increase the sensitivity of MEMS gyroscopes through tuning and, furthermore, to find the optimally tuned configuration for this state of increased sensitivity. The tuning method was tested for the second generation JPL/Boeing Post-resonator MEMS gyroscope using the measurement of the frequency response of the MEMS device in open-loop operation.

Keywords: MEMS, dynamic hill climbing, evolvable hardware, genetic algorithms, gyroscope, simulated annealing

82 Hybrid search algorithms

Roy P. Pargas, Jennifer Ludwick, Steven Spoon

April 1997 **Proceedings of the 1997 ACM symposium on Applied computing**

Full text available: pdf(443.96 KB) Additional Information: full citation, references, index terms

Keywords: dynamical systems, optimization, parallel processing

83 Session S8.2: system synthesis: HW / SW partitioning approach for reconfigurable system design

K. Ben Chehida, M. Auguin

October 2002 **Proceedings of the 2002 international conference on Compilers, architecture, and synthesis for embedded systems**

Full text available: pdf(520.12 KB) Additional Information: full citation, abstract, references, citings, index terms

This paper presents a Genetic Algorithm (GA) based approach for Hardware/Software

partitioning targeting an architecture composed of a processor and a dynamically reconfigurable datapath (FPGA). From an acyclic task graph and a set of Area-Time implementation trade off points for each task, our GA performs HW/SW partitioning and scheduling such that the global application execution time is minimized. The efficiency of our GA is established through its application to an AC-3 decoder function and ...

Keywords: HW/SW partitioning, clustering, codesign, dynamic reconfiguration, genetic algorithm

84 Optimal Blade System Design of a New Concept VTOL Vehicle Uusing the Departmental Computing Grid System

Jin Woo Park, Si Hyoung Park, In Seong Hwang, Ji Joong Moon, Youngha Yoon, Seung Jo Kim

November 2004 **Proceedings of the 2004 ACM/IEEE conference on Supercomputing**

Full text available: pdf(1.01 MB) Additional Information: full citation, abstract

The blade system of a new concept VTOL vehicle is designed utilizing high performance and Grid computing technologies. The VTOL vehicle called cyclocopter employs a cycloidal propulsion system to generate the propulsion and lift for VTOL maneuver. The structural design and weight minimization of the composite blade system are critically related to the efficiency of whole cyclocopter system. The structural design is carried out using a hybrid genetic algorithm-based optimization framework on the ...

85 NoC design and optimisation: Power-aware communication optimization for networks-on-chips with voltage scalable links

Dongkun Shin, Jihong Kim

September 2004 **Proceedings of the 2nd IEEE/ACM/IFIP international conference on Hardware/software codesign and system synthesis**

Full text available: pdf(122.24 KB) Additional Information: full citation, abstract, references, index terms

Networks-on-Chip (NoC) is emerging as a practical development platform for future systems-on-chip products. We propose an energy-efficient static algorithm which optimizes the energy consumption of task communications in NoCs with voltage scalable links. In order to find optimal link speeds, the proposed algorithm (based on a genetic formulation) globally explores the design space of NoC-based systems, including task assignment, tile mapping, routing path allocation, task scheduling and link spe ...

Keywords: low-power design, network-on-chip, real-time systems

86 Book reviews

Karen T. Sutherland

March 2001 **intelligence**, Volume 12 Issue 1

Full text available: pdf(88.41 KB) html(34.55 KB) Additional Information: full citation, references, index terms

87 AGENTS: a distributed client-server system for leaf cell generation

Dilvan de Abreu Moreira, Les T. Walczowski

January 1997 **ACM Transactions on Design Automation of Electronic Systems (TODAES)**, Volume 2 Issue 1

Full text available: pdf(727.66 KB) Additional Information: full citation, abstract, references, index terms

The AGENTS system is a set of programs designed to generate automatically the mask-level layout of full custom CMOS, BICMOS, and bipolar leaf cells. The system is formed from four

sever programs: the placer, router, database, and broker.The placer places components in a cell, the router wires the circuits sent to it, the database stores all the information that is dependent upon the fabrication process, such as the design rules, and the Broker makes the services of the other serv ...

Keywords: client/server model, genetic algorithms, software agents

88 The influence of learning in the behavior of information retrieval adaptive agents
Francisco B. Pereira, Ernesto Costa
March 2000 **Proceedings of the 2000 ACM symposium on Applied computing - Volume 1**
Full text available: pdf(493.42 KB) Additional Information: full citation, references, index terms

Keywords: artificial life, evolution, information retrieval, learning

89 Organizational engineering (OE): Applying scheduling techniques to minimize the number of late jobs in workflow systems
Gregório Baggio, Jacques Wainer, Clarence Ellis
March 2004 **Proceedings of the 2004 ACM symposium on Applied computing**
Full text available: pdf(268.62 KB) Additional Information: full citation, abstract, references, index terms

Ordering the cases in a workflow can result in significant decrease on the number of late jobs. But merging workflow and scheduling is not trivial. This paper presents some of the problems of using scheduling results in ordering cases in a workflow and tackles two of them: the uncertainties on the cases' processing times and routing. A new approach to modeling these uncertainties is also proposed: the guess and solve technique. It consists of making a guess on the execution times and routes the ...

Keywords: scheduling, simulation, workflow

90 Compilation: Mapping reference code to irregular DSPs within the retargetable, optimizing compiler COGEN(T)
Gary William Grewal, Charles Thomas Wilson
December 2001 **Proceedings of the 34th annual ACM/IEEE international symposium on Microarchitecture**
Full text available: pdf(1.11 MB) Additional Information: full citation, abstract, references, citings
Publisher Site

Generating high quality code for embedded processors is made difficult by irregular architectures and highly encoded parallel instructions. Rather than deal with the target machine at every stage of the compilation, a promising new methodology employs generic algorithms to optimize code for an idealized abstraction of the true target machine. This code, called reference code, is then mapped to the real instruction set by enhanced genetic algorithms. One perturbs the original schedule to find a n ...

91 Applications of machine learning and rule induction
Pat Langley, Herbert A. Simon
November 1995 **Communications of the ACM**, Volume 38 Issue 11
Full text available: pdf(554.28 KB) Additional Information: full citation, abstract, references, citings, index terms, review

Machine learning is the study of computational methods for improving performance by

mechanizing the acquisition of knowledge from experience. Expert performance requires much domain-specific knowledge, and knowledge engineering has produced hundreds of AI expert systems that are now used regularly in industry. Machine learning aims to provide increasing levels of automation in the knowledge engineering process, replacing much time-consuming human activity with automatic tec ...

92 Simulation-based techniques for dynamic test sequence compaction

Elizabeth M. Rudnick, Janak H. Patel

January 1997 **Proceedings of the 1996 IEEE/ACM international conference on Computer-aided design**

Full text available: pdf(272.65 KB) Publisher Site Additional Information: full citation, abstract, references, citings, index terms

Simulation-based techniques for dynamic compaction of test sequences are proposed. The first technique uses a fault simulator to remove test vectors from the partially-specified test sequence generated by a deterministic test generator if the vectors are not needed to detect the target fault, considering that the circuit state may be known. The second technique uses genetic algorithms to fill the unspecified bits in the partially-specified test sequence in order to increase the number of faults ...

Keywords: dynamic test compaction, compact test sets, sequential circuit test generation, genetic algorithms

93 A flexible image search engine

Panrit Tosukhowong, Frederic Andres, Kinji Ono, Nicolas Dessaigne, José Martinez, Nouredine Mouaddib, Douglas C. Schmidt

October 1999 **Proceedings of the seventh ACM international conference on Multimedia (Part 2)**

Full text available: pdf(581.93 KB) Additional Information: full citation, references, index terms

Keywords: MediaSys, fuzzy logic, image search engine, retrieval by content

94 Computer applications in health care (CAHC): Automatic fitting of cochlear implants with evolutionary algorithms

C. Bourgeois-République, J. J. Chabrier, P. Collet

March 2004 **Proceedings of the 2004 ACM symposium on Applied computing**

Full text available: pdf(460.24 KB) Additional Information: full citation, abstract, references, index terms

This paper presents an optimisation algorithm designed to perform *in-situ* automatic fitting of cochlear implants.All patients are different, which means that cochlear parametrisation is a difficult and long task, with results ranging from perfect blind speech recognition to patients who cannot make anything out of their implant and just turn it off.The proposed method combines evolutionary algorithms and medical expertise to achieve autonomous interactive fitting through a Personal Digita ...

Keywords: cochlear implants, interactive evolutionary optimization

95 Adaptive information agents in distributed textual environments

Filippo Menczer, Richard K. Belew

May 1998 **Proceedings of the second international conference on Autonomous agents**

Full text available: pdf(1.13 MB) Additional Information: full citation, references, citings, index terms

96 KEYNOTE SPEECH: Interaction, imagination and immersion some research needs
Thomas B. Sheridan
October 2000 **Proceedings of the ACM symposium on Virtual reality software and technology**
Full text available: pdf(819.54 KB) Additional Information: full citation, abstract, references, citings

This paper discusses four ways that humans interact with their environments, plus four variables that determine the experience of virtual reality, and also which of the interactions support which of the VR-enhancing variables. Some philosophical issues abou immersion, the experience of presence, and the meaning of realit are then considered. The engineering paradigm of estimation is then reviewed as a way of bridging classical ontologica differences of opinion about reaility. Finally some VR res ...

Keywords: Human, applications, definition, education, haptics, imagination, immersion, interaction, ontology, presence, reality, spirituality, surgery, vehicles, virtual

97 Face recognition: A literature survey
W. Zhao, R. Chellappa, P. J. Phillips, A. Rosenfeld
December 2003 **ACM Computing Surveys (CSUR)**, Volume 35 Issue 4
Full text available: pdf(4.28 MB) Additional Information: full citation, abstract, references, citings, index terms

As one of the most successful applications of image analysis and understanding, face recognition has recently received significant attention, especially during the past several years. At least two reasons account for this trend: the first is the wide range of commercial and law enforcement applications, and the second is the availability of feasible technologies after 30 years of research. Even though current machine recognition systems have reached a certain level of maturity, their success is ...

Keywords: Face recognition, person identification

98 A biological programming model for self-healing
Selvin George, David Evans, Steven Marchette
October 2003 **Proceedings of the 2003 ACM workshop on Survivable and self-regenerative systems: in association with 10th ACM Conference on Computer and Communications Security**
Full text available: pdf(1.00 MB) Additional Information: full citation, abstract, references

Biological systems exhibit remarkable adaptation and robustness in the face of widely changing environments. By adopting properties of biological systems, we hope to design systems that operate adequately even in the presence of catastrophic failures and large scale attacks. We describe a programming paradigm based on the actions of biological cells and demonstrate the ability of systems built using our model to survive massive failures. Traditional methods of system design require explicit p ...

99 Motion patterns: Layered dynamic control for interactive character swimming
Po-Feng Yang, Joe Laszlo, Karan Singh
August 2004 **Proceedings of the 2004 ACM SIGGRAPH/Eurographics symposium on Computer animation**
Full text available: pdf(1.71 MB) Additional Information: full citation, abstract, references, index terms

This paper proposes a layered strategy for controlling character motion in a dynamically varying environment. We illustrate this approach in the context of a physically simulated human swimmer. The swimmer attempts to follow a dynamic target by augmenting cyclic stroke control with a set of pre-specified variations, based on the current state of the character and its environment. Control of a given swim stroke is decomposed into three layers: a basic stroke sequence, a set of per-stroke contr ...

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Relevance scale

61 A language for describing predictors and its application to automatic synthesis

Joel Emer, Nikolas Gloy

May 1997 **ACM SIGARCH Computer Architecture News , Proceedings of the 24th annual international symposium on Computer architecture**, Volume 25 Issue 2

Full text available: pdf(1.51 MB) Additional Information: full citation, abstract, references, citings, index terms

As processor architectures have increased their reliance on speculative execution to improve performance, the importance of accurate prediction of what to execute speculatively has increased. Furthermore, the types of values predicted have expanded from the ubiquitous branch and call/return targets to the prediction of indirect jump targets, cache ways and data values. In general, the prediction process is one of identifying the current state of the system, and making a prediction for some as ye ...

62 Modeling methodology: A framework for distributed simulation optimization

Björn Gehlsen, Bernd Page

December 2001 **Proceedings of the 33nd conference on Winter simulation**

Full text available: pdf(349.11 KB) Additional Information: full citation, abstract, references, citings, index terms

The system presented bridges the gap between three different research areas: discrete event simulation, heuristic optimization methods and distributed systems technology. Its goal is to provide a framework which supports an efficient implementation of simulation optimization projects, including heuristic optimum seeking procedures and parallel execution of experiments. It is written completely in Java and only uses components that are publicly available, including software libraries from academi ...

63 Software/modelware tutorials I: eM-Plant: eliminate bottlenecks with integrated analysis tools in eM-Plant

Matthias U. Heinicke, Alan Hickman

December 2000 **Proceedings of the 32nd conference on Winter simulation**

Full text available: pdf(243.24 KB) Additional Information: full citation, abstract, references, citings

To build a realistic simulation model is all very well - to add real value you must identify the major difficulties and generate better alternatives. Tecnomatix Technologies, developers of eM-Plant, the object oriented simulation tool for discrete event simulation, planning and optimization of production and logistics, are the world leaders of the e-Manufacturing market. eM-Plant is used across many industries from manufacturers like BMW and

Daimler-Chrysler through shipyards to international fi ...

64 Books reviews
Lynellen D. S. Perry, Erika Orrick
June 1999 **Crossroads**, Volume 5 Issue 4
Full text available: html(40.85 KB) Additional Information: full citation, index terms

65 Simulation optimization: methods and applications
Yolanda Carson, Anu Maria
December 1997 **Proceedings of the 29th conference on Winter simulation**
Full text available: pdf(1.04 MB) Additional Information: full citation, references, citings, index terms

66 Evolutionary co-operative design between human and computer: implementation of "the genetic sculpture park"
Duncan Rowland, Frank Biocca
February 2000 **Proceedings of the fifth symposium on Virtual reality modeling language (Web3D-VRML)**
Full text available: pdf(1.98 MB) Additional Information: full citation, abstract, references, index terms

The Genetic Sculpture Park seeks to blur the distinction between artist and observer and to empower the novice in the creation of complex computer graphic models. Each visitor to the park experiences a unique set of forms and engages in a co-operative dialogue with the computer to produce more aesthetically pleasing designs. Inspired by Darwin's Theory of Evolution, Genetic Algorithms are used to allow visitors to 'breed' forms tailored to his or her own individual sense of aesthetics. This ...

67 Evolutionary hardware: Evolving analog controllers for correcting thermoacoustic instability in real hardware
Saranyan A. Vigraham, John C. Gallagher, Sanjay K. Boddhu
June 2005 **Proceedings of the 2005 conference on Genetic and evolutionary computation GECCO '05**
Full text available: pdf(566.93 KB) Additional Information: full citation, abstract, references, index terms

Previous research demonstrated that Evolvable Hardware (EH) techniques can be employed to suppress Thermoacoustic (TA) instability in a computer simulated combustion chamber. Though that work established basic feasibility, there were still significant questions concerning whether those techniques would function in the real world. This paper presents the results of the next incremental step between controlling in pure simulation and controlling a real combustion chamber. In it, we will examine is ...

Keywords: evolvable hardware

68 Market-based recommendation: Agents that compete for consumer attention
Sander M. Bohte, Enrico Gerding, Han La Poutré
November 2004 **ACM Transactions on Internet Technology (TOIT)**, Volume 4 Issue 4
Full text available: pdf(616.32 KB) Additional Information: full citation, abstract, references, index terms

The amount of attention space available for recommending suppliers to consumers on e-commerce sites is typically limited. We present a competitive distributed recommendation mechanism based on adaptive software agents for efficiently allocating the "consumer attention space," or banners. In the example of an electronic shopping mall, the task is

delegated to the individual shops, each of which evaluates the information that is available about the consumer and his or her interests (e.g. keywor ...

Keywords: ACE, agent-based computational economics, competitive multi-agent systems, electronic markets, learning agents, market-based programming, recommendation systems

69 Applications in logistics, transportation, and distribution: Maufacturing supply chain applications 1: supply chain multi-objective simulation optimization

Jeffrey A. Joines, Deepak Gupta, Mahmut Ali Gokce, Russell E. King, Michael G. Kay

December 2002 **Proceedings of the 34th conference on Winter simulation: exploring new frontiers**

Full text available: pdf(177.07 KB) Additional Information: full citation, abstract, references, citings

A critical decision companies are faced with on a regular basis is the ordering of products and/or raw materials. Poor decisions can lead to excess inventories that are costly or to insufficient inventory that cannot meet its customer demands. These decisions may be as simple as "How much to order" or "How often to order" to more complex decision forecasting models. This paper addresses optimizing these sourcing decisions within a supply chain to determine robust solutions. Utilizing an exist ...

70 General applications and methodology: General methodology 3: global search strategies for simulation optimisation

George D. Magoulas, Tillal Eldabi, Ray J. Paul

December 2002 **Proceedings of the 34th conference on Winter simulation: exploring new frontiers**

Full text available: pdf(236.39 KB) Additional Information: full citation, abstract, references

Simulation optimization is rapidly becoming a mainstream tool for simulation practitioners, as several simulation packages include add-on optimization tools. In this paper we are concentrating on an automated optimization approach that is based on adapting model parameters in order to handle uncertainty that arises from stochastic elements of the process under study. We particularly investigate the use of global search methods in this context, as these methods allow the optimization strategy ...

71 Optimal RF design using smart evolutionary algorithms

Peter Vancorenland, C. De Ranter, M. Steyaert, G. Gielen

June 2000 **Proceedings of the 37th conference on Design automation**

Full text available: pdf(123.38 KB) Additional Information: full citation, references, citings, index terms

72 Applications: An evolutionary optimization approach for 3D human head model classification

Hau-San Wong, Kent K. T. Cheung, Horace H. S. Ip

November 2003 **Proceedings of the 5th ACM SIGMM international workshop on Multimedia information retrieval**

Full text available: pdf(677.93 KB) Additional Information: full citation, abstract, references, index terms

Classification of 3-D head models based on their shape attributes for subsequent indexing and retrieval are important in many applications, as in the selection and generation of human characters in virtual scenes, and the composition of morphing sequences requiring a qualitatively similar target head model. Simple feature representations are more efficient but may not be adequate for distinguishing the subtly different head model classes. In view of these, we propose an optimization approach bas ...

Keywords: 3D head model, evolutionary computation, genetic algorithm, multiple classifier system, pattern classification

73 Parallel and distributed systems and networking: DEVOpT: a distributed architecture supporting heuristic and metaheuristic optimization methods

Eder N. Mathias, Celso M. da Costa, Fernando L. Dotti, Felipe M. Müller

March 2002 **Proceedings of the 2002 ACM symposium on Applied computing**

Full text available: pdf(834.81 KB) Additional Information: full citation, abstract, references, index terms

This paper presents a distributed software architecture that allows the cooperation among research institutions in the field of Combinatorial Optimization --- *DEVOpT*: Distributed Evolutionary Optimization Centers. It has as main aims to share existing algorithms for optimization problems, to allow the easy testing of these algorithms with existing instances, to provide fast and better ways to design new algorithms, and to share computational power among the cooperating institutions. This ...

Keywords: distributed environment, heuristics and metaheuristics, master-slave approach, optimization algorithms

74 Future of simulation: Panel: future of simulation: panel session: the future of simulation

Jerry Banks

December 2001 **Proceedings of the 33nd conference on Winter simulation**

Full text available: pdf(271.72 KB) Additional Information: full citation, abstract, references, index terms

Panelists representing seven areas of application give their views on the future of simulation. There is some consistency, but not a lot. Optimization, the web, training, supply chain management, graphics, and real time simulation received two mentions each. However, depending on how the counting is performed, there are another six areas with a single mention.

75 An evolutionary hybrid approach to the design of a decision support system

V. Loia, A. Staiano, R. Tagliaferri, S. Sessa

March 2000 **Proceedings of the 2000 ACM symposium on Applied computing - Volume 1**

Full text available: pdf(416.36 KB) Additional Information: full citation, references, index terms

Keywords: decision support systems, fuzzy logic, genetic computation, neural networks

76 Posters and Short Papers: The evolutionary sound synthesis method

Jônatas Manzolli, Adolfo Maia, Jose Fornari, Furio Damiani

October 2001 **Proceedings of the ninth ACM international conference on Multimedia**

Full text available: pdf(2.02 MB) Additional Information: full citation, abstract, references, citings, index terms

A mathematical model for interactive sound synthesis based on the application of Genetic Algorithms (GA) is presented. The Evolutionary Sound Synthesis Method (ESSynth) generates sequences of waveform variants by the application of genetic operators on an initial population of waveforms. We describe how the waveforms can be treated as genetic code, the fitness evaluation methodology and how genetic operations such as crossover and mutation are used to produce generations of waveforms. Finally, w ...

77 Incorporating imprecise computation into system-level design of application-specific heterogeneous multiprocessors

Yosef G. Tirat-Gefen, Diogenes C. Silva, Alice C. Parker

June 1997 **Proceedings of the 34th annual conference on Design automation - Volume 00**

Full text available: pdf(324.76 KB) Publisher Site

Additional Information: full citation, abstract, references, index terms

This paper introduces a basic mixedinteger-linear model (MILP) to design application-specificheterogeneous multiprocessors (ASHM) allowingimprecise computation of tasks executed ina non-preemptive mode.The proposed model wasused in the development of a genetic algorithm integratedinto the tool set MEGA that uses soft computingtechniques for design of optimal/near-optimalASHMs subject to constraints on performance, costand output-data quality.

78 Adaptation/load balancing: Resource-aware exploration of the emergent dynamics of simulated systems

Sven A. Brueckner, H. Van Dyke Parunak

July 2003 **Proceedings of the second international joint conference on Autonomous agents and multiagent systems**

Full text available: pdf(261.47 KB) Additional Information: full citation, abstract, references, index terms

The emerging science of simulation enables us to explore the dynamics of large and complex systems even if a formal representation and analysis of the system is intractable and a construction of a real-world instantiation for the purpose of experimentation is too expensive. A computer simulation model can be run for many more configurations and the accumulated observations deepen our understanding of the system's operation, but it is very important that we have tools that help us manage the huge ...

Keywords: graph coloring, multi-agent coordination, phase change, search, simulation, system dynamics, tools and methods

79 RF design methodology: NSGA-based parasitic-aware optimization of a 5GHz low-noise VCO

Min Chu, David J. Allstot, Jeffrey M. Huard, Kim Y. Wong

January 2004 **Proceedings of the 2004 conference on Asia South Pacific design automation: electronic design and solution fair ASP-DAC '04 , Proceedings of the 2004 conference on Asia South Pacific design automation: electronic design and solution fair ASP-DAC '04**

Full text available: pdf(231.75 KB) Publisher Site

Additional Information: full citation, abstract, references

A parasitic-aware RF synthesis tool based on a non-dominated sorting genetic algorithm (NSGA) is introduced. The NSGA-based optimizer casts the design problem as a mulit-objective optimization problem and offers multiple solutions along the Pareto optimal front. Monte-Carlo simulations are then performed to efficiently assess sensitivity at solution points with respect to process, voltage, and temperature (PVT) variations. An example design of a 10mW 5GHz voltage-controlled oscillator (VCO) in 2 ...

80 Topical web crawlers: Evaluating adaptive algorithms

Filippo Menczer, Gautam Pant, Padmini Srinivasan

November 2004 **ACM Transactions on Internet Technology (TOIT)**, Volume 4 Issue 4

Full text available: pdf(679.03 KB)

Additional Information: full citation, abstract, references, citings, index terms

Topical crawlers are increasingly seen as a way to address the scalability limitations of universal search engines, by distributing the crawling process across users, queries, or even client computers. The context available to such crawlers can guide the navigation of links with the goal of efficiently locating highly relevant target pages. We developed a framework to fairly evaluate topical crawling algorithms under a number of performance metrics. Such a framework is employed here to evalua ...

Keywords: Efficiency, evaluation, evolution, exploitation, exploration, reinforcement learning, topical crawlers

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Relevance scale

41 Late breaking results: posters: Genetic algorithm to generate optimized soft keyboard

Mathieu Raynal, Nadine Vigouroux

April 2005 **CHI '05 extended abstracts on Human factors in computing systems**

Full text available: pdf(91.64 KB) Additional Information: full citation, abstract, references, index terms

In this paper, we propose a genetic algorithm formal framework to optimize character location on a soft keyboard. This method is described regardless of the language and layout used and can then easily be adapted to any language and layout. In this scope, we present a measure, based on Mackenzie's model, to estimate the performances of the best characters in a given layout. We apply our method to common English language and two different layouts (hexagonal and rectangular layout) in order to com ...

Keywords: genetic algorithm, performance, text entry, virtual keyboard

42 Fuzzy genetic controllers for the autonomous rendezvous and docking problem

Vijayarangan Gopalan, Abdollah Homaifar, M. Reza Salami, R. W. Dabney, Bijan Sayyarrodsari

February 1995 **Proceedings of the 1995 ACM symposium on Applied computing**

Full text available: pdf(582.45 KB) Additional Information: full citation, references, index terms

Keywords: docking, fuzzy, genetic algorithm, transportation

43 Constrained GA applied to production and energy management of a pulp and paper mill

Amâncio Santos, António Dourado

February 1999 **Proceedings of the 1999 ACM symposium on Applied computing**

Full text available: pdf(863.76 KB) Additional Information: full citation, references, index terms

Keywords: genetic algorithms, multi-objective mathematical programming, production scheduling

44

Distributed computing with APL
Andreas Geyer-Schulz, Thomas Kolarik
July 1992 **ACM SIGAPL APL Quote Quad , Proceedings of the international conference on APL**, Volume 23 Issue 1
Full text available: pdf(921.92 KB) Additional Information: full citation, references, citings, index terms

45 Reviewed papers: Comparing the template method and strategy design patterns in a genetic algorithm application
Michael R. Wick, Andrew T. Phillips
December 2002 **ACM SIGCSE Bulletin**, Volume 34 Issue 4
Full text available: pdf(63.24 KB) Additional Information: full citation, abstract, references

We present a genetic algorithm software project that serves to give students direct experience with choosing among multiple potentially applicable design patterns. We carefully constructed this project to illustrate the power of design patterns in supporting encapsulation while at the same time providing a single context in which to compare and contrast similar design pattern alternatives.

46 Search-based software engineering: An approach for QoS-aware service composition based on genetic algorithms
Gerardo Canfora, Massimiliano Di Penta, Raffaele Esposito, Maria Luisa Villani
June 2005 **Proceedings of the 2005 conference on Genetic and evolutionary computation GECCO '05**
Full text available: pdf(185.78 KB) Additional Information: full citation, abstract, references, index terms

Web services are rapidly changing the landscape of software engineering. One of the most interesting challenges introduced by web services is represented by Quality Of Service (QoS)--aware composition and late--binding. This allows to bind, at run--time, a service--oriented system with a set of services that, among those providing the required features, meet some non--functional constraints, and optimize criteria such as the overall cost or response time. In other words, QoS--aware composition c ...

Keywords: QoS--aware composition, service--oriented software engineering

47 Evolutionary hardware: Toward evolved flight
Rusty Hunt, Gregory S. Hornby, Jason D. Lohn
June 2005 **Proceedings of the 2005 conference on Genetic and evolutionary computation GECCO '05**
Full text available: pdf(829.35 KB) Additional Information: full citation, abstract, references, index terms

We present the first hardware-in-the-loop evolutionary optimization on an ornithopter. Our experiments demonstrate the feasibility of evolving flight through genetic algorithms and adaptable hardware, without the requirement for a thorough knowledge of the aerodynamics of flapping flight. In this research we successfully optimized forward velocity and basic efficiency on an actual hardware ornithopter. The ornithopter was flown integrated to a "whirling-arm" test apparatus, allowing lengthy expe ...

Keywords: evolutionary algorithm, evolvable hardware, flapping flight, hardware-in-the-loop evolution, ornithopter

48 Automatic test bench generation for validation of RT-level descriptions: an industrial experience

F. Corno, M. Sonza Reorda, G. Squillero, A. Manzone, A. Pincetti
January 2000 **Proceedings of the conference on Design, automation and test in Europe**

Full text available: pdf(200.61 KB) Publisher Site Additional Information: full citation, references, citings, index terms

49 Evolutionary testing of classes
Paolo Tonella
July 2004 **ACM SIGSOFT Software Engineering Notes , Proceedings of the 2004 ACM SIGSOFT international symposium on Software testing and analysis**, Volume 29 Issue 4

Full text available: pdf(200.07 KB) Additional Information: full citation, abstract, references, index terms

Object oriented programming promotes reuse of classes in multiple contexts. Thus, a class is designed and implemented with several usage scenarios in mind, some of which possibly open and generic. Correspondingly, the unit testing of classes cannot make too strict assumptions on the actual method invocation sequences, since these vary from application to application.In this paper, a genetic algorithm is exploited to automatically produce test cases for the unit testing of classes in a generic us ...

Keywords: automated test case generation, genetic algorithms, object-oriented testing

50 Wolverines: standard cell placement on a network of workstations
S. Mohan, P. Mazumder
November 1992 **Proceedings of the conference on European design automation**

Full text available: pdf(664.37 KB) Additional Information: full citation, references, index terms

51 Evolutionary computation and optimization (ECO): Call me e-mail: arranging the keyboard with a permutation-coded genetic algorithm
Jeffrey S. Goettl, Alexander W. Brugh, Bryant A. Julstrom
March 2005 **Proceedings of the 2005 ACM symposium on Applied computing**

Full text available: pdf(112.06 KB) Additional Information: full citation, abstract, references, index terms

Keyboard design is a combinatorial problem of perennial interest to those who work with computers. An evolutionary algorithm can search a space of key arrangements for one that is easy to use. Its genotypes represent candidate keyboards, and its fitness function measures the difficulty of typing a specified body of text. Here, a genetic algorithm seeks to arrange the twenty-six letter and six punctuation marks (four of the latter in two pairs) on three rows of ten keys each. It encodes keyboards ...

Keywords: genetic algorithms, keyboard design, permutation coding

52 Manufacturing applications: Simulation optimization in manufacturing analysis: simulation based optimization for supply chain configuration design
Tu Hoang Truong, Farhad Azadivar
December 2003 **Proceedings of the 35th conference on Winter simulation: driving innovation**

Full text available: pdf(646.63 KB) Additional Information: full citation, abstract, references

The design of a supply chain network as an integrated system with several tiers of suppliers is a difficult task. It consists of making strategic decisions on the facility location, stocking

location, production policy, production capacity, distribution and transportation modes. This research develops a hybrid optimization approach to address the Supply Chain Configuration Design problem. The new approach combines simulation, mixed integer programming and genetic algorithm. The genetic algori ...

53 Hardware evolution system AdAM

Tomofumi Hikage, Hitoshi Hemmi, Katsunori Shimohara

April 1999 **Communications of the ACM**, Volume 42 Issue 4

Full text available: pdf(173.57 KB) html(8.14 KB) Additional Information: full citation, references, index terms

54 Evolutionary computing and optimization: Issues in parallelizing multiobjective evolutionary algorithms for real world applications

David A. Van Veldhuizen, Jesse B. Zydallis, Gary B. Lamont

March 2002 **Proceedings of the 2002 ACM symposium on Applied computing**

Full text available: pdf(862.18 KB) Additional Information: full citation, abstract, references, index terms

The concepts of efficiency and effectiveness must be addressed in conducting research into using a Evolutionary Algorithm (EA) for optimization problems. The increased use of evolutionary approaches for real-world applications, containing multiple objectives and high dimensionality, has led to the design and generation of a number of Multiobjective Evolutionary Algorithms (MOEA). When analyzing these algorithms, the issues of effectiveness and efficiency are extremely important and typically dri ...

Keywords: multiobjective evolutionary algorithm, parallel algorithms

55 Parameterised system design based on genetic algorithms

Giuseppe Ascia, Vincenzo Catania, Maurizio Palesi

April 2001 **Proceedings of the ninth international symposium on Hardware/software codesign**

Full text available: pdf(492.18 KB) Additional Information: full citation, abstract, references, citings, index terms

A recent reduction in the time to market has led to the development of a new approach to IP-based design in which a highly parametric pre-designed system-on-a-chip is configured according to the application it will have to execute. The greatest problems in this area regard exploration of the range of possible system configurations in search of the optimal configuration for a given system. There are, in fact, a number of parameters involved (bus sizes, cache configurations, software algorithms ...

Keywords: exploration of system configurations, genetic algorithms, parameterised systems

56 Tournament selection for browsing temporal signals

Ik Soo Lim, Daniel Thalmann

March 2000 **Proceedings of the 2000 ACM symposium on Applied computing - Volume 2**

Full text available: pdf(320.87 KB) Additional Information: full citation, references, index terms

Keywords: audio, browsing, multimedia, retrieval, tournament, user interface, video

57 Distributed systems and grid computing (DSGC): Dynamic scheduling of scientific workflow applications on the grid: a case study

Radu Prodan, Thomas Fahringer

March 2005 **Proceedings of the 2005 ACM symposium on Applied computing**

Full text available: pdf(865.39 KB) Additional Information: full citation, abstract, references, index terms

The existing Grid workflow scheduling projects do not handle recursive loops which are characteristic to many scientific problems. We propose a hybrid approach for scheduling Directed Graph (DG)-based workflows in a Grid environment with dynamically changing computational and network resources. Our dynamic scheduling algorithm is based on the iterative invocation of classical static Directed Acyclic Graphs (DAGs) scheduling heuristics generated using well-defined cycle elimination and task migra ...

Keywords: genetic algorithms, grid computing, optimisation, performance steering, scheduling, scientific workflows

58 Simulation optimization research and development

Royce Bowden, John D. Hall

December 1998 **Proceedings of the 30th conference on Winter simulation**

Full text available: pdf(63.79 KB) Additional Information: full citation, references, citings, index terms

59 High school weekly timetabling by evolutionary algorithms

Carlos Fernandes, João Paulo Caldeira, Fernando Melicio, Agostinho Rosa

February 1999 **Proceedings of the 1999 ACM symposium on Applied computing**

Full text available: pdf(669.72 KB) Additional Information: full citation, references, citings, index terms

Keywords: evolutionary algorithms, repair function, timetabling

60 A market-based rule learning system

QingQing Zhou, Martin Purvis

January 2004 **Proceedings of the second workshop on Australasian information security, Data Mining and Web Intelligence, and Software Internationalisation - Volume 32**

Full text available: pdf(110.85 KB) Additional Information: full citation, abstract, references

In this paper, a 'market trading' technique is integrated with the techniques of rule discovery and refinement for data mining. A classifier system-inspired model, the market-based rule learning (MBRL) system is proposed and its capability of evolving and refining rules is investigated. Experimental results indicate that the MBRL system is a potentially useful additional tool that can be used to refine neural network extracted rules and possibly discover and add some new, better performance rule ...

Keywords: data mining, market-based, rule learning

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Relevance scale

21 The use of genetic algorithms and neural networks to investigate the Baldwin effect

Michael Jones, Aaron Konstam

February 1999 **Proceedings of the 1999 ACM symposium on Applied computing**

Full text available: pdf(455.88 KB) Additional Information: full citation, references, index terms

Keywords: Baldwin effect, genetic algorithms, learning, neural networks

22 Manufacturing applications: Productivity improvement: productivity improvement in the wood industry using simulation and artificial intelligence

Felipe F. Baesler, Milton Moraga, Francisco J. Ramis

December 2002 **Proceedings of the 34th conference on Winter simulation: exploring new frontiers**

Full text available: pdf(175.74 KB) Additional Information: full citation, abstract, references

The objective of this article is to present the results obtained after using a simulation optimization methodology applied to a production line from a secondary manufacturing wood processing plant of a well known Chilean mill. For this reason a simulation model constructed in ARENA, was integrated to a genetic algorithms heuristic. The results obtained show that using a different configuration of the plant resources, it is possible to reduce the total average cycle time in 18%. The resource c ...

23 The genome generator: simulating the development of junk DNA

Robert W. McGrail, S. Rebecca Thomas, Michael Tibbetts

May 2003 **Journal of Computing Sciences in Colleges**, Volume 18 Issue 5

Full text available: pdf(72.97 KB) Additional Information: full citation, abstract, references, index terms

The authors extend the work of Loomis and Gilpin, as reported in [12], to further explore the effects of arbitrary insertions, deletions, and reversals on the development of vestigial sequences, otherwise known as "junk DNA," within genomes. In addition to its utility as a research aid, the Genome Generator has proven to be a valuable pedagogical aid for undergraduate courses in biology, bioinformatics, and computer science. Indeed, the fundamental ideas behind this tool are so simple that we ha ...

24 Evolving and messaging decision-making agents

Edmund S. Yu

May 2001 **Proceedings of the fifth international conference on Autonomous agents**

Full text available: pdf(240.53 KB) Additional Information: full citation, abstract, references, index terms

In this paper we describe our neurogenetic approach to developing a multi- agent decision support system which assists users in gathering, merging, analyzing, and using information to assess risks and make recommendations in situations that may require tremendous amounts of time and attention of the users. In Phase I of this project, called the EMMA project, we demonstrated the feasibility of a set of solutions to various problems by building an intelligent agent application that makes reco ...

Keywords: adaptation and learning, agent communication languages, evolution of agents, information agents, multi-agent communication/collaboration

25 Genetic algorithms in optimizing simulated systems

George Tompkins, Farhad Azadivar

December 1995 **Proceedings of the 27th conference on Winter simulation**

Full text available: pdf(508.14 KB) Additional Information: full citation, references, citings, index terms

26 Coevolution: The emulation of social institutions as a method of coevolution

Deborah Vakas Duong, John Grefenstette

June 2005 **Proceedings of the 2005 conference on Genetic and evolutionary computation GECCO '05**

Full text available: pdf(146.58 KB) Additional Information: full citation, abstract, references, index terms

This paper offers a novel approach to coevolution based on the sociological theory of symbolic interactionism. It provides a multi-agent computational model along with experimental results that suggest improved fitness, robustness, and knowledge due to emergent symbol systems. The main contribution of the symbolic-interactionist approach to coevolution is the concept of the emergence of a system in the abstract, where an interface between agents evolves. The interface is an emergent symbol syste ...

Keywords: cooperative coevolution, evolutionary computation, multi-agent systems, social science simulation

27 Evolving intelligent text-based agents

Edmund S. Yu, Ping C. Koo, Elizabeth D. Liddy

June 2000 **Proceedings of the fourth international conference on Autonomous agents**

Full text available: pdf(1.14 MB) Additional Information: full citation, references, citings, index terms

Keywords: evolution of agents, information agents, learning and adaptation, multi-agent teams

28 Workshop and conference summaries: The SEMINAL workshop: reformulating software engineering as a metaheuristic search problem

Mark Harman, Bryan F. Jones

November 2001 **ACM SIGSOFT Software Engineering Notes**, Volume 26 Issue 6

Full text available: pdf(587.65 KB) Additional Information: full citation, abstract, references

This paper reports on the first international Workshop on Software Engineering using

Metaheuristic INnovative ALgorithms.The aim of the workshop was to bring together researchers in search-based metaheuristic techniques with researchers and practitioners in Software Engineering. The workshop sought to support and develop the embryonic community which straddles these two communities and which is working on the application of metaheuristic search-based techniques to problems in Software Engineerin ...

29 Synthetic hypertext and hyperfiction: A genetic algorithm approach to interactive narrative generation



TeongJoo Ong, John J. Leggett
August 2004 **Proceedings of the fifteenth ACM conference on Hypertext & hypermedia**

Full text available: pdf(146.16 KB) Additional Information: full citation, abstract, references, index terms

We discuss the design of the Hybrid Evolutionary-Fuzzy Time-based Interactive (HEFTI) storytelling engine. HEFTI uses genetic algorithms at its core to recombine and evaluate story components generated from a set of story templates. The system allows authors to rely on HEFTI to perform recombination, mutation and selection operations that generate logically congruent variants of the original story via traversal, generation and deletion of (links in) the story elements.

Keywords: genetic algorithms, interactive narrative, storytelling engines

30 Introduction & overview of "artificial life"—evolving intelligent agents for modeling & simulation



A. Martin Wildberger
November 1996 **Proceedings of the 28th conference on Winter simulation**

Full text available: pdf(987.66 KB) Additional Information: full citation, references

31 Real world applications: Learning basic navigation for personal satellite assistant using neuroevolution



Yiu Fai Sit, Risto Miikkulainen
June 2005 **Proceedings of the 2005 conference on Genetic and evolutionary computation GECCO '05**

Full text available: pdf(737.04 KB) Additional Information: full citation, abstract, references, index terms

The Personal Satellite Assistant (PSA) is a small robot proposed by NASA to assist astronauts who are living and working aboard the space shuttle or space station. To help the astronaut, it has to move around safely. Navigation is made difficult by the arrangement of thrusters. Only forward and leftward thrust is available and rotation will introduce translation. This paper shows how stable navigation can be achieved through neuroevolution in three basic navigation tasks: (1) Stopping autorotati ...

Keywords: PSA, enforced sub-populations, neuroevolution

32 Scheduling of multi-product fungible liquid pipelines using genetic algorithms



D. Scott Crane, Roger L. Wainwright, Dale A. Schoenefeld
February 1999 **Proceedings of the 1999 ACM symposium on Applied computing**

Full text available: pdf(609.05 KB) Additional Information: full citation, references, index terms

Keywords: combinatorial optimization, genetic algorithms, pipeling scheduling

33 Real world applications: Evolving computer intrusion scripts for vulnerability assessment and log analysis

Julien Budynek, Eric Bonabeau, Ben Shargel

June 2005 **Proceedings of the 2005 conference on Genetic and evolutionary computation GECCO '05**

Full text available: pdf(456.56 KB) Additional Information: full citation, abstract, references, index terms

Evolutionary computation is used to construct undetectable computer attack scripts. Using a simulated operating system, we show that scripts can be evolved to cover their tracks and become difficult to detect from log file analysis.

Keywords: agent-based model, hacker, log analysis, script kiddies, vulnerability assessment

34 Technology to enable learning I: Teaching critical thinking skills in IT using PINE-TRIZ

Ron Fulbright

October 2004 **Proceedings of the 5th conference on Information technology education**

Full text available: pdf(192.65 KB) Additional Information: full citation, abstract, references, index terms

TRIZ is a structured approach stimulating innovative problem solving. Corporations use TRIZ to strengthen employees' critical thinking skills. This paper describes an ongoing effort at the University of South Carolina Upstate to use an extension of TRIZ, called PINE-TRIZ, to develop alternative, and analytical thinking skills in non-traditional information technology students. TRIZ principles are better suited for physical, chemical, and mechanical systems. PINE-TRIZ builds on TRIZ by adding ...

Keywords: IT curriculum design, analytical thinking, critical thinking skills, lateral thinking, logical thinking

35 Enhancing information retrieval by automatic acquisition of textual relations using genetic programming

Agneta Bergström, Patricija Jaksetic, Peter Nordin

January 2000 **Proceedings of the 5th international conference on Intelligent user interfaces**

Full text available: pdf(633.96 KB) Additional Information: full citation, abstract, references, index terms

We have explored a novel method to find textual relations in electronic documents using genetic programming and semantic networks. This can be used for enhancing information retrieval and simplifying user interfaces. The automatic extraction of relations from text enables easier updating of electronic dictionaries and may reduce interface area both for search input and hit output on small screens such as cell phones and PDAs (Personal Digital Assistants).

Keywords: genecic programming, information retrieval, machine learning, natural language processing, semantic networks

36 Holland classifier systems

Andreas Geyer-Schulz

June 1995 **ACM SIGAPL APL Quote Quad , Proceedings of the international conference on Applied programming languages**, Volume 25 Issue 4

Full text available: pdf(1.28 MB) Additional Information: full citation, abstract, references, citings, index terms

A Holland classifier system is an adaptive, general purpose machine learning system which is designed to operate in noisy environments with infrequent and often incomplete feedback. Examples of such environments are financial markets, stock management systems, or chemical processes. In financial markets, a Holland classifier system would develop trading strategies, in a stock management system order heuristics, and in a chemical plant it would perform process control. In this paper we descr ...

Keywords: bucket brigade, classifier system, genetic algorithm, machine learning, triggered operations

37 Evolvable hardware chips for industrial applications

Tetsuya Higuchi, Nobuki Kajihara

April 1999 **Communications of the ACM**, Volume 42 Issue 4

Full text available: pdf(398.72 KB) html(25.20 KB) Additional Information: full citation, references, citings, index terms, review

38 Developing a bidding agent for multiple heterogeneous auctions

Patricia Anthony, Nicholas R. Jennings

August 2003 **ACM Transactions on Internet Technology (TOIT)**, Volume 3 Issue 3

Full text available: pdf(1.15 MB) Additional Information: full citation, abstract, references, citings, index terms

Due to the proliferation of online auctions, there is an increasing need to monitor and bid in multiple auctions in order to procure the best deal for the desired good. To this end, this paper reports on the development of a heuristic decision making framework that an autonomous agent can exploit to tackle the problem of bidding across multiple auctions with varying start and end times and with varying protocols (including English, Dutch and Vickrey). The framework is flexible, configurable, and ...

Keywords: bidding strategy, genetic algorithms, multiple auctions

39 Search-based software engineering: Stress testing real-time systems with genetic algorithms

Lionel C. Briand, Yvan Labiche, Marwa Shousha

June 2005 **Proceedings of the 2005 conference on Genetic and evolutionary computation GECCO '05**

Full text available: pdf(291.17 KB) Additional Information: full citation, abstract, references, index terms

Reactive real-time systems have to react to external events within time constraints: Triggered tasks must execute within deadlines. The goal of this article is to automate, based on the system task architecture, the derivation of test cases that maximize the chances of critical deadline misses within the system. We refer to that testing activity as stress testing. We have developed a method based on genetic algorithms and implemented it in a tool. Case studies were run and results show that the ...

Keywords: genetic algorithms, schedulability theory

40 Sequential circuit test generation in a genetic algorithm framework

Elizabeth M. Rudnick, Janak H. Patel, Gary S. Greenstein, Thomas M. Niermann

June 1994 **Proceedings of the 31st annual conference on Design automation**

Full text available: pdf(181.69 KB) Additional Information: full citation, references, citings, index terms

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1 Real world applications: Interactive estimation of agent-based financial markets models: modularity and learning

Ihsan Ecemis, Eric Bonabeau, Trent Ashburn

June 2005 **Proceedings of the 2005 conference on Genetic and evolutionary computation GECCO '05**

Full text available: pdf(435.60 KB) Additional Information: full citation, abstract, references, index terms

Building upon the interactive inversion method introduced by Ashburn and Bonabeau (2004), we show how to dramatically improve the results by exploiting modularity and by letting the computer learn user preferences.

Keywords: agent-based modeling, interactive evolution

2 Developing a generic genetic algorithm

Melvin Neville, Anaika Sibley

December 2002 **Proceedings of the 2002 annual ACM SIGAda international conference on Ada: The engineering of correct and reliable software for real-time & distributed systems using Ada and related technologies**

Full text available: pdf(240.84 KB) Additional Information: full citation, abstract, references, citings, index terms

Genetic and evolutionary algorithms, inspired by biological processes, provide a technique for programs to "automatically" improve their parameters. We discuss the basics of the algorithms and introduce our own hybrid. The development of this hybrid and its application to a simplified problem, evolving the coefficients for the sine function in a Taylor series, presents opportunities for computer science education with respect to model-building, data structures, and language features. Students mu ...

Keywords: Ada education, artificial intelligence, data structures, evolutionary algorithm, generics, genetic algorithm, software tools, teaching, templates

3 Artificial evolution for computer graphics

Karl Sims

July 1991 **ACM SIGGRAPH Computer Graphics , Proceedings of the 18th annual conference on Computer graphics and interactive techniques**, Volume 25 Issue 4

Full text available: pdf(8.74 MB) Additional Information: full citation, abstract, references, citings, index

terms

This paper describes how evolutionary techniques of variation and selection can be used to create complex simulated structures, textures, and motions for use in computer graphics and animation. Interactive selection, based on visual perception of procedurally generated results, allows the user to direct simulated evolutions in preferred directions. Several examples using these methods have been implemented and are described. 3D plant structures are grown using fixed sets of genetic parameters. I ...

4 Generation of transfer functions with stochastic search techniques

Taosong He, Lichan Hong, Arie Kaufman, Hanspeter Pfister

October 1996 **Proceedings of the 7th conference on Visualization '96**

Full text available: pdf(1.14 MB) Additional Information: full citation, references, citings, index terms

Publisher Site

5 Genetic algorithms: Combating user fatigue in iGAs: partial ordering, support vector machines, and synthetic fitness

Xavier Llorà, Kumara Sastry, David E. Goldberg, Abhimanyu Gupta, Lalitha Lakshmi

June 2005 **Proceedings of the 2005 conference on Genetic and evolutionary computation GECCO '05**

Full text available: pdf(342.37 KB) Additional Information: full citation, abstract, references, index terms

One of the daunting challenges of interactive genetic algorithms (iGAs)---genetic algorithms in which fitness measure of a solution is provided by a human rather than by a fitness function, model, or computation---is user fatigue which leads to sub-optimal solutions. This paper proposes a method to combat user fatigue by augmenting user evaluations with a synthetic fitness function. The proposed method combines partial ordering concepts, notion of non-domination from multiobjective optimization, ...

Keywords: human evaluation, interactive evolutionary computation, support vector machines, synthetic fitness

6 Real world applications: The molecule evoluator: an interactive evolutionary algorithm for designing drug molecules

Eric-Wubbo Lameijer, Ad IJzerman, Joost Kok

June 2005 **Proceedings of the 2005 conference on Genetic and evolutionary computation GECCO '05**

Full text available: pdf(317.94 KB) Additional Information: full citation, abstract, references, index terms

To help chemists design new drugs, we created a tool that uses interactive evolution to design drug molecules, the "Molecule Evoluator". In contrast to most other evolutionary de novo design programs, the molecule representation and the set of mutations enable it to both search the chemical space of all drug like molecules extensively and to fine-tune molecular structures to the problem at hand. Additionally, we use interaction with the user as a fitness function, which is new in evolutionary al ...

Keywords: drug design, interactive evolution, molecule

7 Automatic aircraft conflict resolution using genetic algorithms

Nicolas Durand, Jean-Marc Alliot, Joseph Noailles

February 1996 **Proceedings of the 1996 ACM symposium on Applied Computing**

Full text available: pdf(919.64 KB) Additional Information: full citation, references, citings, index terms

Keywords: air traffic control, conflict resolution, genetic algorithms

8 LibGA: a user-friendly workbench for order-based genetic algorithm research
Arthur L. Corcoran, Roger L. Wainwright
March 1993 **Proceedings of the 1993 ACM/SIGAPP symposium on Applied computing: states of the art and practice**
Full text available: pdf(614.52 KB) Additional Information: full citation, references, citings, index terms

9 Metaheuristics in combinatorial optimization: Overview and conceptual comparison
Christian Blum, Andrea Roli
September 2003 **ACM Computing Surveys (CSUR)**, Volume 35 Issue 3
Full text available: pdf(431.84 KB) Additional Information: full citation, abstract, references, index terms

The field of metaheuristics for the application to combinatorial optimization problems is a rapidly growing field of research. This is due to the importance of combinatorial optimization problems for the scientific as well as the industrial world. We give a survey of the nowadays most important metaheuristics from a conceptual point of view. We outline the different components and concepts that are used in the different metaheuristics in order to analyze their similarities and differences. Two v ...

Keywords: Metaheuristics, combinatorial optimization, diversification., intensification

10 Book reviews
December 1999 **intelligence**, Volume 10 Issue 4
Full text available: pdf(385.82 KB) html(66.61 KB) Additional Information: full citation, references, index terms

11 Genetic algorithms: APL2 implementation and a real life application
Alexander O. Skomorokhov.
June 1996 **ACM SIGAPL APL Quote Quad , Proceedings of the conference on Designing the future**, Volume 26 Issue 4
Full text available: pdf(825.69 KB) Additional Information: full citation, abstract, references, citings, index terms

This paper describes an application oriented approach to the genetic-algorithm technique. The software is implemented in APL2 and exploits availability of user defined operators and separation of general purpose and problem specific code. The paper presents results of applying genetic algorithms to solve real life problems of simulation and predicting input order streams for a large consulting and service company. In an extended version of the paper, implementation of a GUI interface to genetic ...

12 Real world applications: Predicting mining activity with parallel genetic algorithms
Sam Talaie, Ryan Leigh, Sushil J. Louis, Gary L. Raines
June 2005 **Proceedings of the 2005 conference on Genetic and evolutionary computation GECCO '05**
Full text available: pdf(275.36 KB) Additional Information: full citation, abstract, references, index terms

We explore several different techniques in our quest to improve the overall model

performance of a genetic algorithm calibrated probabilistic cellular automata. We use the Kappa statistic to measure correlation between ground truth data and data predicted by the model. Within the genetic algorithm, we introduce a new evaluation function sensitive to spatial correctness and we explore the idea of evolving different rule parameters for different subregions of the land. We reduce the time required ...

Keywords: cellular automata, parallel genetic algorithms

13 Evolving virtual creatures

Karl Sims

July 1994 **Proceedings of the 21st annual conference on Computer graphics and interactive techniques**

Full text available: pdf(84.65 KB) ps(219.40 KB) Additional Information: full citation, abstract, references, citings, index terms

This paper describes a novel system for creating virtual creatures that move and behave in simulated three-dimensional physical worlds. The morphologies of creatures and the neural systems for controlling their muscle forces are both generated automatically using genetic algorithms. Different fitness evaluation functions are used to direct simulated evolutions towards specific behaviors such as swimming, walking, jumping, and following.A genetic language is presented that uses no ...

14 Evolving computer programs using rapidly reconfigurable field-programmable gate arrays and genetic programming

John R. Koza, Forest H. Bennett, Jeffrey L. Hutchings, Stephen L. Bade, Martin A. Keane, David Andre

March 1998 **Proceedings of the 1998 ACM/SIGDA sixth international symposium on Field programmable gate arrays**

Full text available: pdf(1.37 MB) Additional Information: full citation, abstract, references, citings, index terms

This paper describes how the massive parallelism of the rapidly reconfigurable Xilinx XC6216 FPGA (in conjunction with Virtual Computing's H.O.T. Works board) can be exploited to accelerate the time-consuming fitness measurement task of genetic algorithms and genetic programming. This acceleration is accomplished by embodying each individual of the evolving population into hardware in order to perform the fitness measurement task. A 16-step sorting network for seven items was evolved that h ...

15 Construction engineering and project management: CEPM 1: selecting earthmoving equipment fleets using genetic algorithms

Mohamed Marzouk, Osama Moselhi

December 2002 **Proceedings of the 34th conference on Winter simulation: exploring new frontiers**

Full text available: pdf(303.43 KB) Additional Information: full citation, abstract, references

This paper presents an application of simulation optimization in construction utilizing genetic algorithms. The paper focuses on the use of genetic algorithms (GAs) as a tool for optimizing the total cost of earthmoving operations accounting for available equipment models to contractors and their corresponding quantities. The developed genetic algorithm has a powerful computational utility that increases its efficiency. The fitness of generated chromosomes is calculated utilizing a simulation ...

16 Genetic algorithms: Terrain generation using genetic algorithms

Teong Joo Ong, Ryan Saunders, John Keyser, John J. Leggett

June 2005 **Proceedings of the 2005 conference on Genetic and evolutionary computation GECCO '05**

Full text available: pdf(396.15 KB) Additional Information: full citation, abstract, references, index terms

We propose a method for applying genetic algorithms to create 3D terrain data sets. Existing procedural algorithms for generation of terrain have several shortcomings. The most popular approach, fractal-based terrain generation, is efficient, but is difficult for a user to control. Other methods tend to require too much user input. In this paper, we provide an alternative method of terrain generation that uses a two-pass genetic algorithm approach to produce a variety of terrain types using only ...

Keywords: genetic algorithms, geographic information systems (GIS), height field, image processing, terrain generation

17 JavaGenes and Condor: cycle-scavenging genetic algorithms

Al Globus, Eric Langhirt, Miron Livny, Ravishankar Ramamurthy, Marvin Solomon, Steve Traugott

June 2000 **Proceedings of the ACM 2000 conference on Java Grande**

Full text available: pdf(603.01 KB) Additional Information: full citation, references, index terms

Keywords: Condor, Java, genetic algorithms

18 Reconstructing occlusal surfaces of teeth using a genetic algorithm with simulated annealing type selection

Vladimir Savchenko, Lothar Schmitt

May 2001 **Proceedings of the sixth ACM symposium on Solid modeling and applications**

Full text available: pdf(708.02 KB) Additional Information: full citation, abstract, references, citings, index terms

In this paper, we present an application of numerical optimization for surface reconstruction (more precisely: reconstruction of missing parts of a real geometric object represented by volume data) by employing a specially designed genetic algorithm to solve a problem concerning computer-aided design in dentistry. Using a space mapping technique the surface of a given model tooth is fitted by a shape transformation to extrapolate (or reconstruct) the remaining surface of a patient's tooth wit ...

Keywords: computer-aided restoration design, constructive solid geometry, genetic algorithm, simulated annealing, space mapping, surface reconstruction, volume modeling

19 A P2P genetic algorithm environment for the internet

K. C. Tan, M. L. Wang, W. Peng

April 2005 **Communications of the ACM**, Volume 48 Issue 4

Full text available: pdf(97.24 KB) html(22.64 KB) Additional Information: full citation, abstract, references, index terms

Effectively utilizing distributed computational resources while hiding the complexity of the network programming.

20 The use of dynamic contexts to improve casual internet searching

Gondy Leroy, Ann M. Lally, Hsinchun Chen

July 2003 **ACM Transactions on Information Systems (TOIS)**, Volume 21 Issue 3

Full text available: pdf(231.61 KB) Additional Information: full citation, abstract, references, index terms

Research has shown that most users' online information searches are suboptimal. Query optimization based on a relevance feedback or genetic algorithm using dynamic query contexts can help casual users search the Internet. These algorithms can draw on implicit user feedback based on the surrounding links and text in a search engine result set to expand user queries with a variable number of keywords in two manners. Positive expansion adds terms to a user's keywords with a Boolean "and," negative ...

Keywords: Information retrieval, Internet, automatic query expansion, genetic algorithm, implicit user feedback, personalization, relevance feedback

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1 The state of the art in automating usability evaluation of user interfaces

Melody Y. Ivory, Marti A Hearst

December 2001 **ACM Computing Surveys (CSUR)**, Volume 33 Issue 4

Full text available: pdf(2.31 MB) Additional Information: full citation, abstract, references, citings, index terms, review

Usability evaluation is an increasingly important part of the user interface design process. However, usability evaluation can be expensive in terms of time and human resources, and automation is therefore a promising way to augment existing approaches. This article presents an extensive survey of usability evaluation methods, organized according to a new taxonomy that emphasizes the role of automation. The survey analyzes existing techniques, identifies which aspects of usability evaluation aut ...

Keywords: Graphical user interfaces, taxonomy, usability evaluation automation, web interfaces

2 A genetic algorithms tutorial tool for numerical function optimisation

E. K. Burke, D. B. Varley

June 1997 **ACM SIGCSE Bulletin , Proceedings of the 2nd conference on Integrating technology into computer science education**, Volume 29 Issue 3

Full text available: pdf(451.67 KB) Additional Information: full citation, abstract, references, index terms

The field of Genetic Algorithms has grown into a huge area over the last few years. Genetic Algorithms are adaptive methods, which can be used to solve search and optimisation problems over a period of generations, based upon the principles of natural selection and survival of the fittest. This paper describes an innovative tool to introduce the basics of the subject of Genetic Algorithms called GAVIn (Genetic Algorithms Visual Interface). It focuses on the domain of numerical function optimisat ...

3 Evolutionary learning of graph layout constraints from examples

Toshiyuki Masui

November 1994 **Proceedings of the 7th annual ACM symposium on User interface software and technology**

Full text available: pdf(586.25 KB) Additional Information: full citation, abstract, references, citings, index terms

We propose a new evolutionary method of extracting user preferences from examples shown to an automatic graph layout system. Using stochastic methods such as simulated

annealing and genetic algorithms, automatic layout systems can find a good layout using an evaluation function which can calculate how good a given layout is. However, the evaluation function is usually not known beforehand, and it might vary from user to user. In our system, users show the system several pairs of good and ba ...

Keywords: adaptive user interface, genetic algorithms, genetic programming, graph layout, graphic object layout, programming by example

4 Improving performance of an electrical power expert system with genetic algorithms

Mike Goodloe, Sara Graves

June 1988 **Proceedings of the first international conference on Industrial and engineering applications of artificial intelligence and expert systems - Volume 1**

Full text available: pdf(1.57 MB) Additional Information: full citation, abstract, references, index terms

Nickel cadmium batteries are an important source of power for aerospace applications. One such application is being developed at the Marshall Space Flight Center (MSFC) for use with the Hubble Space Telescope. A battery testbed has been built at MSFC to aid in that development. In addition, the Nickel Cadmium Battery Expert System (NICBES) was developed by Martin Marietta Corporation to assist NASA engineers in battery management. This paper describes an extension to NICBES which ...

5 Toward automatic generation of novice user test scripts

David J. Kasik, Harry G. George

April 1996 **Proceedings of the SIGCHI conference on Human factors in computing systems: common ground**

Full text available: pdf(1.03 MB) html(43.25 KB) Additional Information: full citation, references, citings, index terms

Keywords: automated test generation, dialog model specification, genetic algorithms, software engineering test process

6 Developing a generic genetic algorithm

Melvin Neville, Anaika Sibley

December 2002 **Proceedings of the 2002 annual ACM SIGAda international conference on Ada: The engineering of correct and reliable software for real-time & distributed systems using Ada and related technologies**

Full text available: pdf(240.84 KB) Additional Information: full citation, abstract, references, citings, index terms

Genetic and evolutionary algorithms, inspired by biological processes, provide a technique for programs to "automatically" improve their parameters. We discuss the basics of the algorithms and introduce our own hybrid. The development of this hybrid and its application to a simplified problem, evolving the coefficients for the sine function in a Taylor series, presents opportunities for computer science education with respect to model-building, data structures, and language features. Students mu ...

Keywords: Ada education, artificial intelligence, data structures, evolutionary algorithm, generics, genetic algorithm, software tools, teaching, templates

7 Genetic algorithms: APL2 implementation and a real life application

Alexander O. Skomorokhov

June 1996 **ACM SIGAPL APL Quote Quad , Proceedings of the conference on Designing the future**, Volume 26 Issue 4

Full text available: pdf(825.69 KB) Additional Information: full citation, abstract, references, citings, index terms

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8 Using Java to develop Web based tutorials

David Cole, Roger Wainwright, Dale Schoenefeld

March 1998 **ACM SIGCSE Bulletin , Proceedings of the twenty-ninth SIGCSE technical symposium on Computer science education**, Volume 30 Issue 1

Full text available: pdf(680.67 KB) Additional Information: full citation, abstract, references, citings, index terms

This paper presents the use of Java applets acting as a web-based interface to existing, platform dependent software tools. We present an example application called GAWebTutor which was constructed from a comprehensive genetic algorithm package and web-based Java components. In effect, we packaged an interactive genetic algorithms tutorial and made it available to anyone on the WWW. Furthermore, by building a GUI front end to an existing application in Java, we leveraged browser technology to ov ...

9 Reconstructing occlusal surfaces of teeth using a genetic algorithm with simulated annealing type selection

Vladimir Savchenko, Lothar Schmitt

May 2001 **Proceedings of the sixth ACM symposium on Solid modeling and applications**

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In this paper, we present an application of numerical optimization for surface reconstruction (more precisely: reconstruction of missing parts of a real geometric object represented by volume data) by employing a specially designed genetic algorithm to solve a problem concerning computer-aided design in dentistry. Using a space mapping technique the surface of a given model tooth is fitted by a shape transformation to extrapolate (or reconstruct) the remaining surface of a patient's tooth wit ...

Keywords: computer-aided restoration design, constructive solid geometry, genetic algorithm, simulated annealing, space mapping, surface reconstruction, volume modeling

10 LibGA: a user-friendly workbench for order-based genetic algorithm research

Arthur L. Corcoran, Roger L. Wainwright

March 1993 **Proceedings of the 1993 ACM/SIGAPP symposium on Applied computing: states of the art and practice**

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11 Reviewed papers: Comparing the template method and strategy design patterns in a genetic algorithm application

Michael R. Wick, Andrew T. Phillips

December 2002 **ACM SIGCSE Bulletin**, Volume 34 Issue 4

Full text available: pdf(63.24 KB) Additional Information: full citation, abstract, references

We present a genetic algorithm software project that serves to give students direct experience with choosing among multiple potentially applicable design patterns. We carefully constructed this project to illustrate the power of design patterns in supporting encapsulation while at the same time providing a single context in which to compare and contrast similar design pattern alternatives.

12 Genetic algorithms in optimizing simulated systems

George Tompkins, Farhad Azadivar

December 1995 **Proceedings of the 27th conference on Winter simulation**

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13 Real world applications: Predicting mining activity with parallel genetic algorithms

Sam Talaie, Ryan Leigh, Sushil J. Louis, Gary L. Raines

June 2005 **Proceedings of the 2005 conference on Genetic and evolutionary computation GECCO '05**

Full text available: pdf(275.36 KB) Additional Information: full citation, abstract, references, index terms

We explore several different techniques in our quest to improve the overall model performance of a genetic algorithm calibrated probabilistic cellular automata. We use the Kappa statistic to measure correlation between ground truth data and data predicted by the model. Within the genetic algorithm, we introduce a new evaluation function sensitive to spatial correctness and we explore the idea of evolving different rule parameters for different subregions of the land. We reduce the time required ...

Keywords: cellular automata, parallel genetic algorithms

14 Empirical knowledge and genetic algorithms for selection of amide I frequencies in protein secondary structure prediction

Joachim A. Hering, Peter R. Innocent, Parvez I. Haris

January 2004 **Proceedings of the second conference on Asia-Pacific bioinformatics - Volume 29**

Full text available: pdf(260.12 KB) Additional Information: full citation, abstract, references

Here we investigate an extension of a previously suggested "automatic amide I frequency selection procedure" where we introduce an additional criterion utilizing empirical knowledge on regions within the amide I band (1600--1700 cm^{-1}) found to be particularly sensitive to protein secondary structure. We show that the genetic algorithm provides a solution with good protein secondary structure prediction accuracy.Based on an evaluation set of 13 protein infrared spectra from proteins no ...

Keywords: FTIR spectroscopy, empirical knowledge, genetic algorithms, neural networks, protein secondary structure prediction

15 Papers: Managing user interaction: A modular geometric constraint solver for user interface applications

Hiroshi Hosobe

November 2001 **Proceedings of the 14th annual ACM symposium on User interface software and technology**

Full text available: pdf(901.45 KB) Additional Information: full citation, abstract, references, citings, index terms

Constraints have been playing an important role in the user interface field since its infancy. A prime use of constraints in this field is to automatically maintain geometric layouts of graphical objects. To facilitate the construction of constraint-based user interface applications, researchers have proposed various constraint satisfaction methods and constraint solvers. Most previous research has focused on either local propagation or linear constraints, excluding more general nonlinear ones. ...

Keywords: constraint solvers, geometric constraints, graph layouts, module mechanisms, soft constraints

16 Achieving Dynamic Interfaces with Agent Concepts

Thomas Juan, Leon Sterling

July 2004 **Proceedings of the Third International Joint Conference on Autonomous Agents and Multiagent Systems - Volume 2**

Full text available: pdf(186.30 KB) Additional Information: full citation, abstract, index terms

Traditionally, interfaces of software entities, modules and components are immutable at runtime and carry no information on the meanings of the underlying implementation. We believe this definition of interface imposes a rigid view or context on the interaction of software entities, which impedes software re-use and the development of open/adaptive systems. We propose a novel analysis and design construct called a dynamic interface. Dynamic interfaces capture the social ability of agents and can ...

17 HGA: a hardware-based genetic algorithm

Stephen D. Scott, Ashok Samal, Shared Seth

February 1995 **Proceedings of the 1995 ACM third international symposium on Field-programmable gate arrays**

Full text available: pdf(159.28 KB) Additional Information: full citation, abstract, references, citings, index terms

A genetic algorithm (GA) is a robust problem-solving method based on natural selection. Hardware's speed advantage and its ability to parallelize offer great rewards to genetic algorithms. Speedups of 1-3 orders of magnitude have been observed when frequently used software routines were implemented in hardware by way of reprogrammable field-programmable gate arrays (FPGAs). Reprogrammability is essential in a general-purpose GA engine because certain GA modules require changeability (e.g. t ...

Keywords: field programmable gate arrays, function optimization, parallel genetic algorithms, performance acceleration, performance evaluation

18 GATutor: a graphical tutorial system for genetic algorithms

Charles Prince, Roger L. Wainwright, Dale A. Schoenefeld, Travis Tull

March 1994 **ACM SIGCSE Bulletin , Proceedings of the twenty-fifth SIGCSE symposium on Computer science education**, Volume 26 Issue 1

Full text available: pdf(761.77 KB) Additional Information: full citation, abstract, references, citings, index terms

In this paper we discuss the design and implementation of GATutor, a graphical tutorial system for genetic algorithms (GA). The X Window/Motif system provides powerful tools for the development of a user interfaces with a familiar feel and look. We implemented the Traveling Salesman Problem (TSP) and the Set Covering Problem (SCP) as two example GA problems in the tutorial. The TSP problem uses an order-based chromosome representation (permutation of n objects), while the S ...

19 Tailor: creating custom user interfaces based on gesture

Randy Pausch, Ronald D. Williams
August 1990 **Proceedings of the 3rd annual ACM SIGGRAPH symposium on User interface software and technology**
Full text available: pdf(1.14 MB) Additional Information: full citation, references, citings, index terms

20 Late breaking results: posters: Genetic algorithm to generate optimized soft keyboard
Mathieu Raynal, Nadine Vigouroux
April 2005 **CHI '05 extended abstracts on Human factors in computing systems**
Full text available: pdf(91.64 KB) Additional Information: full citation, abstract, references, index terms

In this paper, we propose a genetic algorithm formal framework to optimize character location on a soft keyboard. This method is described regardless of the language and layout used and can then easily be adapted to any language and layout. In this scope, we present a measure, based on Mackenzie's model, to estimate the performances of the best characters in a given layout. We apply our method to common English language and two different layouts (hexagonal and rectangular layout) in order to com ...

Keywords: genetic algorithm, performance, text entry, virtual keyboard

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1 A genetic algorithms tutorial tool for numerical function optimisation

E. K. Burke, D. B. Varley

June 1997 **ACM SIGCSE Bulletin , Proceedings of the 2nd conference on Integrating technology into computer science education**, Volume 29 Issue 3

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The field of Genetic Algorithms has grown into a huge area over the last few years. Genetic Algorithms are adaptive methods, which can be used to solve search and optimisation problems over a period of generations, based upon the principles of natural selection and survival of the fittest. This paper describes an innovative tool to introduce the basics of the subject of Genetic Algorithms called GAVIn (Genetic Algorithms Visual Interface). It focuses on the domain of numerical function optimisat ...

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Melvin Neville, Anaika Sibley

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Keywords: Ada education, artificial intelligence, data structures, evolutionary algorithm, generics, genetic algorithm, software tools, teaching, templates

3 Improving performance of an electrical power expert system with genetic algorithms

Mike Goodloe, Sara Graves

June 1988 **Proceedings of the first international conference on Industrial and engineering applications of artificial intelligence and expert systems - Volume 1**

Full text available: pdf(1.57 MB) Additional Information: full citation, abstract, references, index terms

Nickel cadmium batteries are an important source of power for aerospace applications. One such application is being developed at the Marshall Space Flight Center (MSFC) for use with the Hubble Space Telescope. A battery testbed has been built at MSFC to aid in that development. In addition, the Nickel Cadmium Battery Expert System (NICBES) was developed by Martin Marietta Corporation to assist NASA engineers in battery management. This paper describes an extension to NICBES which ...

4 Genetic algorithms: APL2 implementation and a real life application

Alexander O. Skomorokhov

June 1996 **ACM SIGAPL APL Quote Quad , Proceedings of the conference on Designing the future**, Volume 26 Issue 4

Full text available: pdf(825.69 KB) Additional Information: full citation, abstract, references, citings, index terms

This paper describes an application oriented approach to the genetic-algorithm technique. The software is implemented in APL2 and exploits availability of user defined operators and separation of general purpose and problem specific code. The paper presents results of applying genetic algorithms to solve real life problems of simulation and predicting input order streams for a large consulting and service company. In an extended version of the paper, implementation of a GUI interface to genetic ...

5 Reconstructing occlusal surfaces of teeth using a genetic algorithm with simulated annealing type selection

Vladimir Savchenko, Lothar Schmitt

May 2001 **Proceedings of the sixth ACM symposium on Solid modeling and applications**

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In this paper, we present an application of numerical optimization for surface reconstruction (more precisely: reconstruction of missing parts of a real geometric object represented by volume data) by employing a specially designed genetic algorithm to solve a problem concerning computer-aided design in dentistry. Using a space mapping technique the surface of a given model tooth is fitted by a shape transformation to extrapolate (or reconstruct) the remaining surface of a patient's tooth wit ...

Keywords: computer-aided restoration design, constructive solid geometry, genetic algorithm, simulated annealing, space mapping, surface reconstruction, volume modeling

6 LibGA: a user-friendly workbench for order-based genetic algorithm research

Arthur L. Corcoran, Roger L. Wainwright

March 1993 **Proceedings of the 1993 ACM/SIGAPP symposium on Applied computing: states of the art and practice**

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7 The state of the art in automating usability evaluation of user interfaces

Melody Y. Ivory, Marti A Hearst

December 2001 **ACM Computing Surveys (CSUR)**, Volume 33 Issue 4

Full text available: pdf(2.31 MB) Additional Information: full citation, abstract, references, citings, index terms, review

Usability evaluation is an increasingly important part of the user interface design process. However, usability evaluation can be expensive in terms of time and human resources, and automation is therefore a promising way to augment existing approaches. This article

presents an extensive survey of usability evaluation methods, organized according to a new taxonomy that emphasizes the role of automation. The survey analyzes existing techniques, identifies which aspects of usability evaluation aut ...

Keywords: Graphical user interfaces, taxonomy, usability evaluation automation, web interfaces

8 Real world applications: Predicting mining activity with parallel genetic algorithms

Sam Talaie, Ryan Leigh, Sushil J. Louis, Gary L. Raines

June 2005 **Proceedings of the 2005 conference on Genetic and evolutionary computation GECCO '05**

Full text available: pdf(275.36 KB) Additional Information: full citation, abstract, references, index terms

We explore several different techniques in our quest to improve the overall model performance of a genetic algorithm calibrated probabilistic cellular automata. We use the Kappa statistic to measure correlation between ground truth data and data predicted by the model. Within the genetic algorithm, we introduce a new evaluation function sensitive to spatial correctness and we explore the idea of evolving different rule parameters for different subregions of the land. We reduce the time required ...

Keywords: cellular automata, parallel genetic algorithms

9 Reviewed papers: Comparing the template method and strategy design patterns in a genetic algorithm application

Michael R. Wick, Andrew T. Phillips

December 2002 **ACM SIGCSE Bulletin**, Volume 34 Issue 4

Full text available: pdf(63.24 KB) Additional Information: full citation, abstract, references

We present a genetic algorithm software project that serves to give students direct experience with choosing among multiple potentially applicable design patterns. We carefully constructed this project to illustrate the power of design patterns in supporting encapsulation while at the same time providing a single context in which to compare and contrast similar design pattern alternatives.

10 Evolutionary learning of graph layout constraints from examples

Toshiyuki Masui

November 1994 **Proceedings of the 7th annual ACM symposium on User interface software and technology**

Full text available: pdf(586.25 KB) Additional Information: full citation, abstract, references, citings, index terms

We propose a new evolutionary method of extracting user preferences from examples shown to an automatic graph layout system. Using stochastic methods such as simulated annealing and genetic algorithms, automatic layout systems can find a good layout using an evaluation function which can calculate how good a given layout is. However, the evaluation function is usually not known beforehand, and it might vary from user to user. In our system, users show the system several pairs of good and ba ...

Keywords: adaptive user interface, genetic algorithms, genetic programming, graph layout, graphic object layout, programming by example

11 Empirical knowledge and genetic algorithms for selection of amide I frequencies in protein secondary structure prediction

Joachim A. Hering, Peter R. Innocent, Parvez I. Haris
January 2004 **Proceedings of the second conference on Asia-Pacific bioinformatics - Volume 29**
Full text available: pdf(260.12 KB) Additional Information: full citation, abstract, references

Here we investigate an extension of a previously suggested "automatic amide I frequency selection procedure" where we introduce an additional criterion utilizing empirical knowledge on regions within the amide I band (1600--1700 cm^{-1}) found to be particularly sensitive to protein secondary structure. We show that the genetic algorithm provides a solution with good protein secondary structure prediction accuracy.Based on an evaluation set of 13 protein infrared spectra from proteins no ...

Keywords: FTIR spectroscopy, empirical knowledge, genetic algorithms, neural networks, protein secondary structure prediction

12 HGA: a hardware-based genetic algorithm
Stephen D. Scott, Ashok Samal, Shared Seth
February 1995 **Proceedings of the 1995 ACM third international symposium on Field-programmable gate arrays**
Full text available: pdf(159.28 KB) Additional Information: full citation, abstract, references, citings, index terms

A genetic algorithm (GA) is a robust problem-solving method based on natural selection. Hardware's speed advantage and its ability to parallelize offer great rewards to genetic algorithms. Speedups of 1-3 orders of magnitude have been observed when frequently used software routines were implemented in hardware by way of reprogrammable field-programmable gate arrays (FPGAs). Reprogrammability is essential in a general-purpose GA engine because certain GA modules require changeability (e.g. t ...

Keywords: field programmable gate arrays, function optimization, parallel genetic algorithms, performance acceleration, performance evaluation

13 Genetic algorithms in optimizing simulated systems
George Tompkins, Farhad Azadivar
December 1995 **Proceedings of the 27th conference on Winter simulation**
Full text available: pdf(508.14 KB) Additional Information: full citation, references, citings, index terms

14 Toward automatic generation of novice user test scripts
David J. Kasik, Harry G. George
April 1996 **Proceedings of the SIGCHI conference on Human factors in computing systems: common ground**
Full text available: pdf(1.03 MB) html(43.25 KB) Additional Information: full citation, references, citings, index terms

Keywords: automated test generation, dialog model specification, genetic algorithms, software engineering test process

15 GATutor: a graphical tutorial system for genetic algorithms
Charles Prince, Roger L. Wainwright, Dale A. Schoenefeld, Travis Tull
March 1994 **ACM SIGCSE Bulletin , Proceedings of the twenty-fifth SIGCSE symposium**

on Computer science education, Volume 26 Issue 1

Full text available: pdf(761.77 KB) Additional Information: full citation, abstract, references, citings, index terms

In this paper we discuss the design and implementation of GATutor, a graphical tutorial system for genetic algorithms (GA). The X Window/Motif system provides powerful tools for the development of a user interfaces with a familiar feel and look. We implemented the Traveling Salesman Problem (TSP) and the Set Covering Problem (SCP) as two example GA problems in the tutorial. The TSP problem uses an order-based chromosome representation (permutation of n objects), while the S ...

16 Late breaking results: posters: Genetic algorithm to generate optimized soft keyboard

Mathieu Raynal, Nadine Vigouroux

April 2005 **CHI '05 extended abstracts on Human factors in computing systems**

Full text available: pdf(91.64 KB) Additional Information: full citation, abstract, references, index terms

In this paper, we propose a genetic algorithm formal framework to optimize character location on a soft keyboard. This method is described regardless of the language and layout used and can then easily be adapted to any language and layout. In this scope, we present a measure, based on Mackenzie's model, to estimate the performances of the best characters in a given layout. We apply our method to common English language and two different layouts (hexagonal and rectangular layout) in order to com ...

Keywords: genetic algorithm, performance, text entry, virtual keyboard

17 Evolutionary computation and optimization (ECO): Call me e-mail: arranging the keyboard with a permutation-coded genetic algorithm

Jeffrey S. Goettl, Alexander W. Brugh, Bryant A. Julstrom

March 2005 **Proceedings of the 2005 ACM symposium on Applied computing**

Full text available: pdf(112.06 KB) Additional Information: full citation, abstract, references, index terms

Keyboard design is a combinatorial problem of perennial interest to those who work with computers. An evolutionary algorithm can search a space of key arrangements for one that is easy to use. Its genotypes represent candidate keyboards, and its fitness function measures the difficulty of typing a specified body of text. Here, a genetic algorithm seeks to arrange the twenty-six letter and six punctuation marks (four of the latter in two pairs) on three rows of ten keys each. It encodes keyboards ...

Keywords: genetic algorithms, keyboard design, permutation coding

18 Genetic algorithms: Combating user fatigue in iGAs: partial ordering, support vector machines, and synthetic fitness

Xavier Llorà, Kumara Sastry, David E. Goldberg, Abhimanyu Gupta, Lalitha Lakshmi

June 2005 **Proceedings of the 2005 conference on Genetic and evolutionary computation GECCO '05**

Full text available: pdf(342.37 KB) Additional Information: full citation, abstract, references, index terms

One of the daunting challenges of interactive genetic algorithms (iGAs)---genetic algorithms in which fitness measure of a solution is provided by a human rather than by a fitness function, model, or computation---is user fatigue which leads to sub-optimal solutions. This paper proposes a method to combat user fatigue by augmenting user evaluations with a synthetic fitness function. The proposed method combines partial ordering concepts, notion of non-domination from multiobjective optimization, ...

Keywords: human evaluation, interactive evolutionary computation, support vector

machines, synthetic fitness

19 Using Java to develop Web based tutorials

David Cole, Roger Wainwright, Dale Schoenefeld

March 1998 **ACM SIGCSE Bulletin , Proceedings of the twenty-ninth SIGCSE technical symposium on Computer science education**, Volume 30 Issue 1

Full text available: pdf(680.67 KB) Additional Information: full citation, abstract, references, citings, index terms

This paper presents the use of Java applets acting as a web-based interface to existing, platform dependent software tools. We present an example application called GAWebTutor which was constructed from a comprehensive genetic algorithm package and web-based Java components. In effect, we packaged an interactive genetic algorithms tutorial and made it available to anyone on the WWW. Furthermore, by building a GUI front end to an existing application in Java, we leveraged browser technology to ov ...

20 An object-oriented genetics information system

Elizabeth Shoop, Jaideep Srivastava, Paul Bieganski, John Riedl, Ernest Retzel

March 1993 **Proceedings of the 1993 ACM/SIGAPP symposium on Applied computing: states of the art and practice**

Full text available: pdf(1.32 MB) Additional Information: full citation, references, index terms

Keywords: computational molecular biology, genome sequencing, graphical user interface, object-oriented database, suffix tree

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L10	1074055	interfac$4	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 16:04
L11	1153593	fit$1 fitness$2	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 16:04
L12	176451	evolv$4 evolution$2	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 16:04
L13	4178	(genetic$1 adj algorithm$1)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 16:04
L14	290	L12 same L13 same L11	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 16:04
L15	3	L14 same L10	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 16:04
L16	159	L14 and L10	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 16:04
L17	21859	"715"/$.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 16:05
L18	6610	"706"/$.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 16:05

L19	28248	L17 xor L18 L17 and L18	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 16:05
L20	43	16 and L19	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 16:05
L21	21	20 and @ad<="20011120"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 16:05

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	21859	"715"/$.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 14:49
L2	714	"715"/700.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 14:49
L3	407	"715"/762.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 14:50
L4	21859	1 xor 2 1 and 2	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 14:50
L5	21859	3 xor 4 3 and 4	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 14:50
L6	36544	gui$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 14:50
L7	1074055	interfac$4	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 14:50
L8	6610	"706"/$.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 14:52
L9	221	1 and 8	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 14:53

L10	69465	chromosom$2	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 14:53
L11	262632	string$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 14:53
L12	2055660	display$4	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 14:54
L13	5638992	solution$1 solv$4	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 14:54
L14	1078891	6 7	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 14:55
L15	3230593	(genetic$1 adj algorithm$1) ga$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 15:34
L16	5085311	problem$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 14:56
L17	1153593	fit$1 fitness$2	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 14:58
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L24	9	23 and @ad<="20011120"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 15:26
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L31	16251	25 and 15 and 17	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 15:34
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L35	953	25 and 34 and 17	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 15:42
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L40	244	35 and 39	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 15:42
L41	290	25 same 34 same 17	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 15:42
L42	89	41 and 39	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2005/07/12 15:42
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